

# Comparative Analysis of Anthropometric Measurements, Biochemical Parameters and Heart Rate Variability between PCOS and Non PCOS Women

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## ABSTRACT

*In our study we included 25 women in the age group of 20 to 35 years who were diagnosed as PCOS and compared the anthropometric measurements between PCOS women and non PCOS women the BMI was more than 30 in both the cases and controls, and it was statistically insignificant indicating obesity in both the groups also found a significant increase in waist hip ratio in women with PCOS when compared to women without PCOS. The total cholesterol, low density lipoprotein (LDL), triglycerides (TGL) and very low-density lipoprotein significantly higher in cases when compared with controls (HDL) was significantly lower in women with polycystic ovarian syndrome. The fasting blood sugar, fasting serum insulin and HOMA insulin resistance significantly elevated in women with PCOS than compared to controls. Time domain parameters like SDRR, RMSSD and pRR50 were also significantly decreased in women with PCOS that signifies parasympathetic withdrawal in them.*

**Key words:** PCOS, LDL, HDL

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## METHODOLOGY

### Inclusion criteria

25 women patients in the age group of 20 to 35 years with irregular menstrual cycles who attended the gynaecology outpatient department of Sree Balaji Medical College and Hospital, Chrompet for treatment of oligomenorrhea amenorrhea newly diagnosed as PCOS by skilled assistants as per Rotterdam ESHRE/ASRM vided 2003(10) criteria in which women who had any two of the following three criteria were taken as cases.

Oligo and/anovulation,

Clinical and/or biochemical signs of hyperandrogenism, Ultrasound evidence of polycystic ovaries (ovaries containing 12 or more follicles measuring 2-9 mm diameter and/or having ovarian volume of >10ml).

25 age matched regularly menstruating women without PCOS who postgraduates, undergraduates, and staffs of Sree Balaji medical college were taken as control group.

### Exclusion criteria

- Women who are pregnant or lactating,
- Women on any drugs like oral hypoglycaemic drugs or insulin, oral contraceptives, steroids, lipid lowering

## INTRODUCTION

PCOS is a combination of ovulation and hyperandrogenism. PCOS can be diagnosed in the absence of androgen excess or menstrual irregularity, and this led to the formulation of new criteria in 2006 by the Androgen Excess Society. The cause of PCOS is still very unclear. Insulin also increases the levels of androgen and estrogen by causing thecal and granulosa stimulation by acting on its own ovarian receptors. Most of the PCOS women (50%) are overweight or obese as assessed by their BMI and they have android pattern of fat distribution. This study aims to compare the anthropometric measurements like height, weight, body mass index, waist circumference, hip circumference and waist hip ratio, biochemical parameters like fasting blood sugar, serum insulin, insulin resistance (HOMA-IR), lipid profile, thyroid profile and heart rate variability in women diagnosed with PCOS with normal women without PCOS in the age group of 20 to 35 years to assess the cardiometabolic risk in women with PCOS [1-5].

drugs, hormonal contraceptives, hypothyroid or hyperthyroid drugs for the past 2 months.

- Women on treatment for infertility.
- Women diagnosed with disease affecting metabolic parameters like diabetes mellitus, Cushing's syndrome, androgen secreting tumours or congenital adrenal hyperplasia, hyperparathyroidism, hyperprolactinemia, thyroid disorders, hypertension etc. were excluded from the study.

25 women patients in the age group of 20 to 35 years with irregular menstrual cycles. Anthropometric measurements like height in cms and weight in kilograms were measured as the study participants stood in their upright position, arms by their sides and footwear removed using the height measuring scale and the weight was measured using electronic weighing machine with light clothes were done. Markers of insulin resistance like acanthosis nigricans and markers of hyperandrogenism like acne and hirsutism were also noted. Biochemical parameters and heart rate value (HRV) levels were also measured.

### RESULTS AND DISCUSSION

In our study when we compared the anthropometric measurements between PCOS women and non PCOS women the BMI was more than 30 in both the cases and controls and it was statistically insignificant indicating obesity in both the groups. However, the waist circumference and the waist hip ratio were found to be significantly more in women with PCOS than in women without PCOS. This is in par with the previous studies in which they compared upper half body fat ratio with lower half body fat ratio in women with PCOS and found that the PCOS women had significant increase in upper half body fat ratio which was independent of BMI. In our study we found that total cholesterol, low density lipoprotein (LDL), triglycerides (TGL) and very low density lipoprotein significantly higher in cases when compared with controls but the High density lipoprotein, This is in par with study done by Richa Lath et al. Insulin resistance also contributes to low level of HDL levels by increasing the HDL catabolism and also increases LDL synthesis in the liver by increasing the activity of cholesterol esterase transfer protein (CE TP) which converts CE enriched VLDL particles in to small dense LDL. In our study we found that fasting blood sugar, fasting serum insulin and HOMA insulin resistance significantly elevated in women with PCOS than compared to controls. In our study we found a positive correlation of waist hip ratio with fasting sugar. This low frequency indicates sympathetic activity, High frequency indicates vagal activity and LF/HF ratio indicates sympathovagal balance. Our study shows that there is sympatho vagal imbalance with high sympathetic dominance in women with PCOS which indicates a reduced HRV [6-10].

### CONCLUSION

This study concludes that obesity especially central adiposity, dyslipidemia, insulin resistance and altered thyroid profile in women with PCOS are more important risk factors for the development of autonomic dysfunction and this paves the way for future risk of cardiovascular disorders. Since alteration in autonomic modulation is an early marker of cardiovascular dysfunction assessment of autonomic functions should be made mandatory for all women with PCOS to prevent cardiac diseases soon. Moreover, early detection will enable an early intervention in the form of diet, exercise and lifestyle modification which decreases the central adiposity and eventually insulin resistance and dyslipidemia and therefore may result in improving the cardiovascular health.

### FUNDING

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### ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

### CONFLICT OF INTEREST

The authors declare no conflict of interest.

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